CHAPTER -2
REVIEW OF LITERATURE

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Regional disparities have become a have become a debated topic during the last two or three decades. Literatures showed regional disparity is a versatile conception, includes aspects such as inequality and convergence.

Review of literature in a research work is essential to develop construction of knowledge to ensure that the present study would be an introduction to the topic. It also provides the direction to the researcher.

2.1) Reviews of Theoretical Studies

Lewis (1954) developed theory of unlimited supply of labour. He divided underdeveloped economy into two sectors; one is the traditional and second is modern sector. The modern sector uses reproducible capital and profit maximization. The traditional sector was subsistence oriented and output per person is lower than in capital sectors. Lewis shows that if unlimited labour is accessible at fixed wage rate the surplus of capitalist would be raising proportional of national income. The subsistence sector adopt modern technique of production net wages would increase in the capitalist sectors. Therefore it decreases the capitalist surplus.

Solow-Swan (1956) gives the powerful intimation of convergence occurrences. This model is expended with human capital then rapidly convergence is excessive. This gives a batter clarification for distinction in income covering countries and regions. Population growth rate are recorded for convergence model (MRW, 1992). Therefore in this model, growth of per capita income is a purpose of basic factor of immovable state.

Johnston and Mellor (1961) analysed the role of agriculture in overall economic development in economy. They stated that supply of labour in agriculture is mandatory to

modern sector as well as mandatory to labour. An agriculture sector is main sources of saving for modern sectors. In underdeveloped countries with labour forces occupied in agriculture. The sources of growth of employment in primary sector are expanded yield technology increasing areas of agriculture land.

Matsuyama (1991) developed two sector growth models. The engine of growth, in this model was the operate, with self-perfection in the manufacturing sector. In case of the closed economy, an increase in agricultural productivity stimulant overall growth. In the contest of open economy is a negatively relationship among agricultural productivity and overall growth.

Kuznets (1995) analysed the relations among the per capita GNP and imbalance in the distribution of income would be take place the shape of 'U'. According to him income of per capita increase, inequality would also increase.

2.2) Reviews of Empirical Studies

2.2.1) Studies in Global context

Mrutyunjay and Das (2009) examined region wise disparities in development of agriculture in Orissa district in the pre & post reform period. They used agricultural development indices and 9 agriculture indicators by deprivation method for different districts of Orissa. This study also identified factors which are responsible for variation in agricultural productivity across districts. This study used regression equation for the yield rate of food grains in 13 districts of Orissa as (the dependent variable) and use of fertilizer, irrigation, rainfall and size of operation land holding as (the explanatory variable). This paper has been used secondary data which have taken from agriculture statistics Orissa. This study divided in four zone of district Orissa. This study found four districts are due to good irrigation facilities and broad tracts of fertile and plain land with alluvial soil. Districts of northern zone are found to be most backward districts. In the post reform period regional disparity in Orissa has been declined.

An analysis of the factors responsible for regional disparity in Orissa is that irrigation is the important factor of agricultural productivity. In Orissa irrigation facility has been provided to 45.62 percent of cultivable land and 54.38 percent is rain fed. This study found there is need to increase irrigation facility. This paper suggested to achieve optimum yield from irrigated water should be delivered to farmer's field in adequate quantity in time. Use of water, efficient and sustainable and distribution should be equitable. Development of ground water should be encouraged by providing in credit for institutional and interest at low rate, subsidised power supply and marketing facilities for sales of agriculture produce.

Xin and Qin (2009) examined dissolve the growth of agricultural labour productivity in like transform in regulations, progress in technology & contribution agriculture inputs per worker. This study found that efficiency to increased TFP growth in agricultural growth. Agricultural growth in china is a phenomenon of progress in production foundries. The loss in productivity gives crack documentation that spreading of prevail agricultural technique in China is inefficient.

This study suggests encouraging the agriculture development in China. Government should increase production of agriculture technology. And increase efficiencies of agriculture production in development of China's agriculture. The convergence found the instruments of disparate regions are divergent. The levels of agricultural labour productivity during the period are different for national sample. Per worker contribution of worker has convergence result on agricultural labour productivity.

Gorman and Pandey (2010) analysed account for the sources of disparities in agriculture productivity covering 79 countries. They recorded the highest disparities in agriculture labour productivity covering these countries and considerable increase in this disparity during the period. This study dissolve the sources of disparity in to a part that can be assigned to input use and one that can be assigned to the efficiency which farmers construct use of

determinants, taking into recorded the fact that determinants   use. This paper founded disparities in land per worker, chemical and fertilizer. This paper showed correlation in agriculture input and agriculture productivity significantly. In particular they identified an important role for per worker agricultural machinery. This study recommendation that policy should be concentrated on empower farmers to obtain capital. The higher part discovered in this study for improved varieties of seed for increasing productivity of labour in the developing world which suggested that future research   highest   productive varieties is accreted.

Esposti (2011) studied disparities regional agricultural productivity in Italian region. This study examined agricultural Total Factor Productivity (TFP) growth in long-term at regional level with used time-series premises. And found factors associated with divergence as opposite to convergence. This study found technological is the key convergence intensity nevertheless of how the spillover effects are calculated.

Kumo (2011) investigates convergence in real per capita GDP and macroeconomic policy in southern Africa. Empirical tests found no proof of convergence in real per capita GDP in the SADC economies. ADF unit root test demonstrated that Botswana and South Africa's real per capita GDP converged. The study found that the economies of the member states have showed a tendency of macroeconomic divergence in 2009.

Motebennur (2012) examined spatial variations in agricultural productivity of Dharwad district in Karnataka state. This study has been made to determine agriculture productivity of major food crops in Dharwad district. This study used M.G. Kendall's ranking coefficient method. This study is used secondary data which have collected from the district statistics office, Dharwad for the year 2008-09, Government of Karnataka. This study found high agricultural productivity in Navalagund and Hubli talukas due to the irrigation facility extended by Mulaprabha river project, black cotton soil use of HYV seeds, fertilizers,

pesticides and the use of modern farm technology. In the medium range of agricultural productivity during 2008-09. There are two talukas, Dharwad and Kundagol, due to the low fertility of soil, lack of irrigation facility. The Kalaghatagi taluk falls under the low productivity region due to lack irrigation facility and traditional minds of farmer. Overall the agricultural productivity region in Dharwad district in under developed with influence of government facilities and programmes to be adopted.

Burja (2011) analysed inputs of the agricultural productivity growth in Romanian regions. Main objective of this study is to found out the factors that influenced agricultural labour productivity in territorial description. This study used a factor analysis model for farm net value added indicator on labour. The expansion of total agricultural productivity was performed with using efficiency scores determined with the Data Envelopment Analysis Method. This paper showed the determinants of productivity disparities in dynamic and territory. The performance of ever one region was studied on the basis of absolute disparity of productivity compared of the indicator in the previous period and the level of the productivity variation founded from the individual action of influence factors.

Sharma (2017) analysed regional disparities in agricultural development in Aligarh district block level over the period. The study has been calculated by combining data related to various variables, percentage share of agricultural workers in total workers, fertilizers consumption, and percentage of tube well and agricultural instruments per thousand hectares. This study used Z- score development in blocks has been categorized. This study found that a technological input has corresponding relationship in agricultural development.

2.2.2) Studies in Indian context

Dev (1987) analysed adjusted and unadjusted growth rates in food grain production major states. This study used standard deviation for variation in output. This paper concludes that

there was advancement but marginal decline in instability at the all-India level. This study found the debate on instability was: after 1979-80 instability in food grain production at all-India level, it is decreasing from 11.41 percent for 1960-61 to 1969-70 to 11.16 percent for 1970-71 to 1979-80. This study concluded that the measures variability in all-India production of food grains did not show any significant.

Nagraj (1987) analysed the factors affecting use of fertilizer in agriculture in India. This study used regression and correlation analysis for fulfil objectives. Spread of HYVs and fertiliser-intensive crops are founded to have a positive impact on consumptions of fertilisers. This study suggested that irrigation is uniformly a dominant influence especially groundwater.

Dev (1988) analysed inter-state variations in agricultural productivity of labour. This paper examined the rural poverty and the agreements in productivity of labour and rural poverty. This study used co-efficient of variation and decomposition of labour productivity. This study found the estimates of labour productivity did bring out sharp variations in its levels. Coefficient of variation increased over the reference points indicating widening of the disparities in productivity of labour. The decomposition of productivity of labour revealed that yield was the major source for the rise in productivity of labour. The analysis on the sources of variability in the levels of productivity of labour shows that in the early 1960s, the contribution of land-man ratio to the variability in labour productivity was higher than that of land productivity. Relatively low variability in labour productivity in the early 1960s was due to the high negative covariance between land productivity and land-man ratio.

The variations in labour productivity and is estimates of rural poverty also revealed wide inter-state disparities in its levels and pattern of change. This study concluded that labour productivity increase through technological changes has had a positive impact on the levels of living of the population in rural areas.

Sharma (1990) examined agriculture performance in various states and the factors affecting performance of agriculture growth during 1966 to 1988. Exponential function has been used to work out the growth rates of production. The study revealed that four states viz. Punjab, Haryana, Uttar Pradesh and Maharashtra experienced growth rates higher than the national average of 2.72 percent per annum. Gujarat, Tamil Nadu and Rajasthan had non-significant growth in the production. Other states witnessed growth rates in food grain production lower than the national average. Tractor implementation pattern was found to be skewed as there was significant variation among different states. It was recommended that to minimize the inter-state disparities in growth of agriculture. The major policy should be on increasing facilities in irrigations in the states, which has lagged behind and to narrow down the adoption gap in the use of fertilizers in various states, which must be supplemented with credit from lending institutions.

Panda (1991) examined the inter-regional disparity and instability in agricultural growth created during a decade period from 1978-79 to 1987-88 in Orissa. Coefficient of variation was used to analyse the yield instability of the crops. Area under cereals showed negative while that under pulses and oilseeds showed positive growth at state level. The production growth was positive in all the three crop groups and it was higher in case of oilseeds compared to cereals and pulses in all the four regions (excepting the Eastern Ghats). Productivity of oilseeds had also performed better than that of cereals and pulses at the state level. Crop wise instability was observed to be maximum with oilseeds and minimum with pulses in almost all the regions during the period under study. The study revealed positive association between higher growth in yield and higher fluctuations in case of oilseeds.

Mundlak et. al. (1997) analysed determinants of agricultural production. This paper found are uniform with the vision that physical capital perform as a limitation to growth of agriculture. At the same time, regression showed that shift to more productive technique is

integrated with a decreasing in labour. This study found the importance of capital in agriculture production. Agricultural capital is an important input of agricultural production.

Bhalla and Singh (1997) analysed of state level area and output. This study found significant improvement in the patterns of levels and growth of agricultural. During the first 20 years, that is from 1962-65 to 1980-83, the effect of the new technology in transforming agriculture was restricted to the north-western and southern states. It revealed that there was acceleration in the agricultural output in India during 1980-83 to 1992-95 as compared with the earlier periods. In the central region, two major states, Madhya Pradesh and Rajasthan recorded very high growth. Despite a slow-down, region of the north-western continued to grow at a respectable rate. An analysis of input use in various regions of India including the eastern region shows that both high levels and growth of yield and output were brought about through increased use of fertilisers and increased investment in minor irrigation. This paper concluded there is a need to remedy the situation. In particular, development of institutional credit must receive high priority. However, agricultural growth and crop diversification was not accompanied by any significant change in labour force diversification.

Adabar (2002) examined growth in India through the convergence implications of neoclassical growth. Here attempted to re-examine economic growth and convergence on focusing on the differences in the 14 major states of India. Population growth rate and human capital along with state particular impact are managed for, and then there has been proof of conditional convergence at the rate around 12 % per five-year. Here focused of policy activism to achieve balanced growth and regional convergence.

Haque (2003) examined on reforms in growth of agriculture and rural development. This paper focused on contract farming which could accelerate the growth of agriculture. The farmers get profit because of his access to technology, inputs quality, self confident price, and market supports. It suggested that, land leasing policy should be to promote contract farming.

Chand and Kumar (2004) examined factors of capital formation and agriculture growth. This paper measured a simultaneous equation model with private and public sector capital formation and GDP agriculture. This study found impact of agriculture subsidies on private investments is also positive. Increase in public investment convenience a rise in private investments. Public sector investments mainly depend upon fiscal resources. This study also found the incensement in subsidies of farm and decreasement in receipts of revenue from agriculture. The study showed that trade-off between transferred resources to agriculture on the revenue account.

Ghosh (2006) examined convergence in Indian agriculture in India. It specifically investigates whether there is existence of convergence in productivity of land and labour. This study recorded the regional convergence or divergence in land and labor productivity. Conditional β-convergence showed significant inter-state disparities in the steady-state levels of productivity of land and labor. The study found the importance of higher growth rates and steady-state levels of productivity of agriculture.

Ghosh (2008) examined economic performance of fifteen major states. This paper examined convergence or divergence across the states in 1960-61 to 2001-02. The main finding of the study was related to strong tendencies to diverge during the post reform period in per capita income. Author found existing policy modifications in economic reforms for reducing regional disparities in per capita income.

Mathur et. al. (2007) explained that there were highest disparities in growth of food grains in agriculture. Their results showed that for the period 1990-91 to 2003-04, public investment and subsidies included in agriculture by the government expenditure. Prices of Agriculture had a positive effect on food grains production. Variables exogenous rainfall and population were also important. At same time, the state-wise analysis from the panel regression result

showed that the agricultural output at current prices was significantly and positively dependent on agriculture.

Balkrishan et. al. (2008) examined the agricultural growth in India since 1991. This study focused on the slow growth of Indian agriculture sector since 1991. They took in to consideration relevant variables to study agricultural growth for the study period. The first was about the agriculture and economic reforms. This study argued that, there is nothing intrinsic to the policy of liberalization of an economy in the form of trade and industrial policy reforms that must be damaging of agricultural. The second section examined agriculture growth since 1991. This study took in to consideration relevant variables to study agricultural growth for the study period. The first was about the agriculture and economic reforms. This paper argued that, there is nothing intrinsic to the policy of liberalization of an economy in the form of trade and industrial policy reforms that must be damaging of agriculture.

The second section showed the percentage, growth of areas, product and yield from 1950-51 to 2005-06. The third section examined some variables like relatives price change, import liberalization, import penetration. The fourth section was about the non-price factor like capital formation, land holdings, expansion and public expenditure on irrigation, public research and extension activities examined by the researcher and lastly they concluded and made some policy implication.

Khomiakova (2008) studied regional divergence in India. This study used exploratory spatial data analysis and structural divergence. This study found income in services sector and industry has positive autocorrelation.

Gaur (2010) analyzed regional disparities in economic growth in India. There are huge gap between active and vibrant regions during the pre-independence period in context of

availability of facilities. After independence, decreasing in inter-state disparities has been focused during Five Year Plans. Inter-state disparity for the period 1980-2002 has been examined with the help of inequality indices that are based on properties of Lorenz curve. Inter-state inequality trend has also been examined through 'sigma convergence and beta convergence.

Hasmi and Iqbal (2010) studied growing inter-state disparities in Indian agriculture. The main objectives of the study are to suggest suitable measure to reduce regional disparities in Indian agriculture. This study found the better performing in western and southern areas and in northern and eastern regions. The variation in the number of tractor use and in cropping intensity has positive impact on the variation in agriculture output. This paper suggested agricultural disparity is found positively associated with the variation in the level of infrastructure, fertilizer consumption and farm mechanisation. The public sector should concentrate on educational programmes for farmers, facility formation of farmer groups. The state government have to make substantial enhancement in watershed management, irrigation and flood control, especially in those state where frequency of such occurrences is very high.

Kumar et. al. (2010) studied inter district variations in the average yield of selected crops in the state of Haryana. This paper selected crops of rice, wheat, gram, barley and potatoes. To determine the factors responsible for the increase in average yield of crops in Haryana used multiple regression models. This study found the average yield of major crops at national level very significant, there is need to strengthen infrastructure relating to agriculture sector. In the state of Haryana different districts have distinct advantage to raise various crops depending upon agro climate conditions. This paper suggested that there is need to strengthen the infrastructure relating to agriculture sector. More capital formation needs to be done in rural sector. There is need to formulate policies for the improvement of yield of different crops. Credit facilities should be provided to farmers at appropriate.

Nandi (2010) examined inter-state and inter-regional disparities in food grain in India. For measuring the disparities in production of food grains as well as of different crops she used coefficient of variation. Author used T - Statistics for convergence and divergence. This study found the overall improvement in the growth performance of eastern India has been an important development hat has positively affected the overall performance of the Indian agriculture during the 1990. Disparities in crop of rice increased from 0.09 to 0.12 percent during the period. Disparities of crop wheat decreased between 1950-51 to 1962-63 and increased between 1962-63 to 1966-67. During the 1989-1990 growth rate for both food grain and non food grain declined from 3.72 to 2.35 percent.

Panda (2010) analysed the inter-state disparities and irrigation in the post-reform period, to measure the relationship between irrigation and agricultural development and to examine the inter-state inequity in distribution on gross cropped area and credit employment in commercial banks. This study covered the period 1992-93 to 1999-2000. This study used compound average growth rate and gini coefficient of concentration for measure the extent of inequality in the share of gross cropped area. He found all India level acreage under canal irrigation has declined while that underground water irrigation has gone up. For Bihar and Maharashtra area under canal irrigation has gone up while that underground water has fallen. In case of developed state like Gujarat, Haryana, Karnataka, Punjab. The value of gini co-efficient of concentration in regard to credit distribution among states has also found to have increased from 0.322 to 0.350 percent between 1995-96 and 1999-2000 respectively. This paper suggested that there has need for stepping up direct credit to farmers by the institutional agencies.

Thakur (2010) studied inter–regional disparities in a comparative study of agricultural development in each zone state. This paper focused on some key issues-like use of fertilizer by the UP, Andhra, Bihar and Gujarat states. Regional imbalance in fertilizer is state wise

consuming about 22 percent, of total fertilizer consumption of India followed by Andhra Pradesh, Bihar and Gujarat come lower consuming states in comparison northern and southern zone. This paper suggested desired agriculture growth. And have to increase fertilizer consumption in state Uttar Pradesh and Andhra Pradesh. In each state where the agricultural production is low can be diversified with Pisciculture, Sericulture and Floriculture will also provide market rates for agricultural produce at state level.

This study also found Punjab is famous for rice, major producer of wheat, Andhra Pradesh is famous for Tobacco and cotton, Bihar is famous for paddy, fruit and Gujarat is famous for cotton and sugarcane.

Asayehengn (2012) examined the effect of small-scale irrigation on household income. This study was based on both primary and secondary data. This study found the income of mean irrigation consumer to non-consumer exceed with 37.03 percent. This study concluded that livestock and utilization to working capital is factors for irrigation utilization.

Maan et. al. (2012) examined growth and performance in agriculture sector. State wise data in term of total gross area, irrigated area and population have been collected by schedule commercial bank. Data have been used for the year 1995 to 2009. Growth rate were used for analysing the data. This study found distribution of fertilizers, advances to the state and direct finances given by the nationalized banks growth rates were significant .The high growth rate areas of above 80.34 percent included the State of Jammu & Kashmir, Meghalaya, Nagaland, and Tripura. Gini coefficient showed that distribution of loans to state electricity boards, gross irrigated area not changed during period the time. The inequality in distribution of loans to distribution of fertilizers and other inputs in relation to net irrigated area had decreased. This study concluded that commercial banks have experience and confidence for dealing with agricultural sector and for decrease disparity over time.

Mundal and Dhara (2012) examined relationship between dependent and independent variable. Secondary data have been taken from census of India. For per unit of productivity seventeen crops were selected and composite index have been used. Z score divided agriculture productivity in four category very high (above +-1000) score, high (+0.000 to +1.000), medium (0.000 to -1.000), low (below-1.000). Composite index shows there are much disparity in level of development. Z-score values of developmental showed that the development is high in the southern blocks in comparison to northern and eastern blocks of the district. This study suggested that for sustainable agrarian development, modern technology of agriculture should have to be adopted.

Maan and Singh (2013) examined role of NABARAD in agriculture. Share of agricultural credit share was 0.9 percent in 1951-52 and 28 percent in 1981-82. The share of nationalisation of banks has been increasing. During 1995 and 2005, the share of agricultural credit with urban and metropolitan bank in India increased with 16.3 percent to 30.7 percent.

Khan et. al. (2013) examined in agriculture development. For analysed development of agriculture composite index have been used with eight indicators. This study selected thirteen variables. Composite index divided, block in three categories. High category score (above +0.21), medium category score (+ 0.21 to -0.21) and low below (-0.21).This study found higher development in upper central part because farmer of this part have better irrigation facilities and high cropping intensity. Medium level found in lower central part. During the period 1981 to 1991, Raipur block was under in medium score but in 2001 it came in low score because non agriculture have take place. Chakrata block shows low level in all blocks.

Kumar and Jain (2013) studied inter-state variation in agriculture growth in India. Data were taken from ministry of agriculture for the year 1991-99 to 2007-08. For analysed growth and output percent share and CAGR (Compound Annual Growth Rate) used. gini coefficients have been used foe relationship between growth and inequality. This study found low

productivity where low rainfall and low irrigation. Rainfall and fertilizer have significant and positive effect with productivity. Inequality in growth of agriculture has increased. During the period 2000 the part under low category did not higher change but which part under high category increased 35 percent.

Godara and Singh (2014) examined agriculture credit in India. Analysis credit delivery to the agriculture sector was not insufficient. Paper showed that the banking system is on different grounds to gives credit to small and marginal farmers. Transformation and admittance to bank credit throughout the post-bank nationalization period have been not sufficient. This study found the policymakers are convinced on microfinance.

Mukhopadhgay (2014) examined convergence food grains production in India. This study has taken 15 states of food grain production during the period 1991 to 2011. This study was used panel unit root tests, sigma convergence and beta convergence. For analysis sigma convergence three measures S.D and C.V were used. This study showed coefficient variation is significant and positive. This study found in case of food grains production show significant sigma convergence. Based on panel data, significant presence of convergence in production of food grains crops. For panel least square showed that negative but statistically significant relationship between growth in per capita food grains production and the initial level. The agricultural weak state in case of food grains production growing a rapid rate comparison to rich state. This study found beta convergence with the first differenced GMM following dynamic panel which showed significant and positive coefficient in term per capita food grain production.

2.2.3) Studies in Regional Context

Dhaka and Verma (1989) examined growth of area, production and productivity of cereals, pulses and oilseeds group of crops and for some of the important individual crops viz. bajra, guar, wheat, gram and rapeseed and mustard in the state of Rajasthan. This study covered the period 1956 to 1988 with two sub periods 1956 to 1966 and 1966 to 1988. The technique of exponential function was employed for computation of growth rates. The study was carried out over the entire state and two most productive agro-climatic zones viz. I irrigated north western plain and III semi-arid eastern plain. The results revealed that the productivity in all the three groups of crops viz. food grains, pulses and oilseeds was negative during pre-green revolution and entire period of study in the state. This showed that modern technology of high yielding varieties had helped in accelerating the rate of growth in production and productivity of these crop groups. Study on individual crops revealed that growth in production of bajra had declined while that of wheat and rapeseed & mustard had significantly increased. Gram recorded positive and on the contrary guar showed negative growth in their production in the state and zone III (a), causing decline in output during post-green revolution period.

Singh and Singh (1991) in their study pertaining to the changes in cropping pattern and production pattern in Haryana agriculture between 1966-67 to 1988-89 based on secondary data revealed that the area under rice and wheat has been increasing by the rate of 9.29 percent & 6.34 percent respective time period. The area under food grains like jowar, bajra, maize, barley and the area under important pulses crops was increasing with 11.60 percent during the study period. The total production of jowar, maize, barley, gram and the other pulses crops has been declining.

Ali and Singh (1995) examined variability in area, production and productivity in wheat crop of Chhattisgarh as well as the state of Madhya Pradesh**.** Time series data has been used to analyze it from 1970-71 to 1989-90. The study revealed more variability in area, production and productivity of wheat. This study computed coefficient of variation for all the districts, regions and the state as a whole in respect of area, production and productivity. It ranged with 19.23 percent in district of Billaspur to 40.40 percent in Rajnandgaon district. The highest coefficient of variation (36.51 percent) was observed in the district of Rajnandgon. The significant growth rates were mostly due to improvement in productivity levels.

Narain et. al. (2001) analysed yield rate of crops in Uttar Pradesh where two crops rice and wheat selected. This study analysed variations during 1985-86 to 1989-90 and 1990-91 to 1994-95. This study found variation between two periods more significant in both crops rice and wheat. Mean of this period is very high both crops are significant means there is variations in climate conditions. This studied in different tehsils of rice, wheat and combined rice-wheat. Composite index were used for this analysis. The score of composite index varied from 0.13 to 0.96 for crop rice and 0.16 to 0.99 for crop wheat. The variation in the composite index of rice and wheat combined productivity is 0.23 to 0.99.

This study found increased 18 percent productivity in rice and 10.5 percent productivity in wheat. The productivity levels of each of rice and wheat crops are separately having very high comparison with the combined productivity of rice-wheat. There are many disparities and variations in the rice and wheat productivity are found in different tehsils. Western and hilly areas are found to be better developed in rice and wheat productivity in comparison to other regions of the State.

Rawal (2004) analysed the siri system of labour hiring as it is practised in western region of Haryana. Primary data were collected from Birdhana, a village in Fatehabad district. The case study of Birdhana district suggests that two features of agrarian economy Birdhana - large

size holding's and availability of labour displacing technology. The design of siri contract ensured that the siri households provided as much family labour as possible and mobilized cheap hired labour.

Chaudhary and Madan (2006) examined the regional disparities in development and income from agriculture associated with the variations in Haryana. The observed variations in production and income are the direct outcome of growth of necessary infrastructure and input supply agriculture like irrigation, mechanisation, fertilizer, credit   marketing etc. Region having more area under rice; wheat and sugarcane had more income from agriculture than the region where low income crops like bajra, guar, pulses, and oilseeds are predominant.

Mohanty (2009) examined regional disparity in agriculture development in Maharashtra. Secondary data have been taken from season and crop report of Maharashtra and planning commission Government of India. This study concluded that the development of agriculture in Maharashtra over the last three decades indicated regional inequality in which western Maharashtra remained much ahead of other regions in the term of major development indicators. However, compared to Vidarbha the Maratha Wada region experienced better improvement in some respects. The rapid development in western Maharashtra was assigned to the rise of the Maratha kunabi peasants as a unified political class who dominated states politics through caste and kinship network during the colonial periods. The modernization of agriculture in the region was also in the interest of the industrial bourgeois because it created a nearby market for modern agricultural appliances' and opportunities for the establishment of agro-processing industries.

Reddy and Sivashankarmma (2010) examined trends in agricultural productivity and analysed the relative association of agricultural productivity with selected independent variable for the period 1978-79 to 1997-98. This study was based on both primary and secondary data. Data were collected by field survey and from handbook of statistics

department of Andhra Pradesh. This study found positive and significant trend in Chittoor district in Andhra Pradesh. In agricultural productivity, a linear growth rate was of 9.18 percent was recorded during the study period. This study suggested improved the agricultural productivity by increasing actual annual rainfall, worker area ratio, land concentration ratio and worker area ratio.

Reddy and Reddy (2010) examined growth and instability in irrigated area under different surface sources of irrigation. For fulfilled the objectives of study, this study used simple average and percentage method. This study also used log linear model for estimate the relationship between total surface sources of irrigation and the canal, tank, other surface sources of irrigation. This paper observed that the three variables surface sources, ground water sources and other sources of irrigation.

Ardeshna and Khunt (2011) examined the gap between actual use and recommended dose of fertilizer and to identify the factors determining the fertilizer used in major crops grown in Gujarat. The study revealed that the gap in respect of use of nitrogenous as observed in all the selected crops but in case of phosphatic, the gap was observed only in bajra crop. The magnitude of gap was higher generally in large farmers. Use of potassic was found more than recommended does in all the crops. In Kharif crops like groundnut and bajra, rainfall has great impact in determination of level of fertilizer use, whereas in crops like cotton and wheat, irrigated area, per farm gross income, lagged prices and cropping intensity where the major factors which determine level of use of fertilizer in this crops. Among the all the modern input, fertilizers played a vital role in modern agriculture. It universally accepted as an integral part of package of practice for rising Indian agriculture to a higher technological plank. The problems become more acute after green revolution because of winding gap between recommended dose of fertilizers and actual use of farmers. Unless addition of plant nutrients which have been removed from these soils in the past is made. Plant nutrients are

essential not only for increasing production but also for maintaining fertility of the soils at desired level. The factors determining the use of fertilizer need to be critically analysed to narrow gap in nutrients supply capacity of soil and nutrient requirement of the plant for sustainable productivity of the crops.

Ajagekar and Masal (2012) examined the regional disparities in the level of agriculture development in Kolhapur district and the disparities in Bhudargad tehsil at micro level. For determine the level of agricultural development in Kolhapur district 14 indicators have been selected. They have been assigned different weights to different indicators by the method of proportional standardized mean and calculated composite index. The districts are grouped in four categories first group of agricultural development cover 15.61 percent areas of the district. This zones covers two tehsils namely Hatkangale, Shirol whose composite index is 20 points above the district average. The second zone is fairly developed. It consists of three tehsils namely Godhinglaj, Karveer and Kagal covering 23.65 percent area of the district. This zone possesses the composite index higher than the district average but less than 20 points. Third zone is poorly developed. This covers almost half of the district total area. Fourth zone is very poorly developed.

Das and Mili (2012) studied the pattern of crop diversification and disparities in agriculture in Assam during the period between 1999-2000 and 2009-10. This paper used Gibb's Martien index of crops diversification. Disparities in agriculture analysed by two varieties (a) proportion of net area sown and (b) cropping intensity. This paper found cultivation of food-grain and the largest share of crop hectare was occupied by tea. This paper concluded that the environmental constraints and natural resources localized in few areas and technological input, infrastructure and facilities was very low and not equally distributed in all the areas.

Kumar et. al. (2012) examined disparities in agriculture development of Haryana, and also explained that how regional disparities have behaved under market forces after liberalisation of Indian economy. This paper used composite development index to measure the extent of regional disparities in agriculture development of Haryana for the year 1990-92, 2000-02 and 2007-09. This paper found inter-district regional disparities between districts of northern and southern Haryana. This study found two factors green revolution and irrigation facilities are responsible for disparities in agriculture development. Intensity of irrigation facility in north is high. This paper showed that in Haryana regional disparities in agriculture development have convergence from 1990-92 to 2000-02, but after this convergence in 2007-09 divergence has started again. This paper suggested special problem oriented planning should be initiated to expand development to all the horizons. Expansion of irrigation facilities to southern and backward districts is most important in them.

Pawar and Jadhav (2012) examined regional disparity in agricultural development in Satara district of Maharashtra. In this paper agricultural disparity has been analysed at tehsil level. This study was based on secondary data and it was taken from district census 2001 and annual report of irrigation department 2010. It is found that due to physiographic, climatic, soil and ground water level are agriculture disparity induced factors. From the foregoing study it is inferred that tehsils Khandala, Javali, Mahableshwar, Patan, Khatav, and Men are underdeveloped whereas Phaltan, Koregaon and Wail are partly developed or developing tehsils. It is suggested that improved irrigation facilities should be practiced for sustainable regional development of agriculture in the agriculturally underdeveloped region of the district. For the sustainable regional development in Satara district there is need of watershed development programme and introduction of new method of irrigation.

Muthumurugan and Elumalai (2012) examined inter-regional variation in agriculture development of Tamilnadu. Data have been taken from State planning commission

Tamilnadu census report and Statistical handbook. This paper have selected 16 indicators for determine the level of agriculture development for the year 1998-99 to 2008-09. This paper used composite index of development for different district. They found wide disparity in among the region of Tamilnadu. Erode has a topper rank in respect of selected variables because the district have more irrigation facilities. This paper found Nilgris has last rank in selected variable because the district is hilly and covered by forest. The land of this district has not able to produce food and other crops. This study suggested Government have to concentration on backward district for make appropriate plan to reduce the agricultural variation in Tamilnadu.

Ramphal (2012) examined performance and suitability of growing crops in Haryana. This study used three measures location quotient, crops versatility index and district versatility index. The specialization of wheat in Panipat, Hisar and Faridabad districts, rice in kurukshatra, kaithal and karnal districts and Faridabad in highest during the period of study.

Patil (2013) examined disparities in levels of agricultural development in Dhule and Nandurbar Districts. In this study included different indicators for analysed of agricultural development with the help of composite index. This study suggested that in Haryana the major policy should be enhancing irrigation facilities in southern region. Fixation of higher procurement prices of oilseeds and pulses and proper arrangements for of the produce of these crops should be given top priority.

Shafiqullah (2013) analysed variations in the levels of agricultural development and casual relationship between dependent variable and independent variables among the districts of the state of Uttar Pradesh. This study has been selected 14 indicators.

This study suggested that districts having low level of regional development should be given top priority.

Shimar (2014) examined growth and instability in agriculture production in Haryana. This study based on second data with 12 major districts. Coefficient of variation is also used to measure the instability in time series data. This paper showed that the instability is low in crop wheat in all the districts. The instability in production of rice is decreasing with karnal, Kurushatra, Ambala, Jind, Hisar, Sirsa and Faridabad districts throughout the study period.

Singh et. al. (2014) examined disparities in agriculture development in Rajasthan. This study covered the time period 1990-2010 with thirty district of Rajasthan. This study was calculated by mean and standard deviation and time period divided in five year for the productivity of agriculture. District have been divided in three category high category those score above (mean + variance), and moderate which score between (mean + variance) whereas low below (mean + variance). They shows deserts districts are low productive comparative non deserts districts. This study concluded productivity increased during the period due to technology. During the period of 1995-2000 numbers of low productive district were increased and all low productive district under desert areas. This study suggested government should focus on this district because higher difference between desert and non desert areas.

Comparative Table

Global level studies		
Authors	**Methods**	**Major findings**
Mrutyunjay and Das (2009)	Composite Agricultural Development Index and Regression Analysis	This study found there is need to increase irrigation facility.
Xin and Qin (2009)	TFP growth	The convergence found that the instruments of various regions are dissimilar. Per worker contribution of workers have convergence effect on agricultural labour productivity.
Gorman and Pandey (2010)	TFP growth	This Study founded that disparities in fertilizer, chemical and land per worker. This paper showed correlation in agriculture input and agriculture productivity significantly.
Motebennur (2012)	Kendall's Ranking Coefficient Method	This study found high agricultural productivity in Navalagund and Hubli talukas due to the irrigation facility extended by Mulaprabha river project, black cotton soil use of HYV seeds, fertilizers, pesticides and the use of modern farm technology
Burja (2011)	Factor Analysis Model	Study found conclusive effect on the evolution of the indicators
Indian level studies		
Dev (1987)	Standard Deviation & Coefficient of Variation	This study found the debate on instability in food grain production; it is decreasing from 11.41 percent for 1960-61 to 1969-70 to 11.16 percent for 1970-71 to 1979-80.
Nagraj (1987)	Regression and Correlation Analysis	This study suggested that irrigation is uniformly a dominant influence - especially groundwater.

Dev (1988)	Coefficient of Variation and Decomposition of labour productivity	This study analysed variability in the productivity of labour shows that in the early 1960s, the contribution of land-man ratio to the variability in labour productivity was higher than that of land productivity
Ghosh(2012)	Convergence	This paper suggested the less developed states could upgrade their relative economic position with investments in physical.
Kumar and Jain(2013)	Compound Annual Growth Rate	This study found low productivity where low rainfall and low irrigation. Rainfall and fertilizer have significant and positive effect with productivity. Inequality in growth of agriculture has increased
Godara and Singh(2014)	Percentage Share	The analysis states level analysis that the credit in agriculture sector not insufficient.
Mundlak et. al. (1997)	Production Technology	This study found the importance of capital in agriculture production.
Bhalla and Singh (1997)	Percentage Share	This study found significant changes in growth of agricultural production.
Haque (2003)	Percentage Share	This study suggested small farmers should benefit from the modern technology.
Chand & Kumar (2004)	Percentage Share	This study found the impact of agricultural subsidies on private investments is also positive.
Narayanmurthy (2007)	Coefficient of Variation & Percentage Share	The cost of cultivation increased substantially in all the major crops.
Bhalla and Singh (2009)	Percentage Share	Punjab is famous for rice, major producer of wheat, Andhra Pradesh is famous for Tobacco and cotton, Bihar is famous for paddy crops.
Hasmi and Iqbal (2010)	Percentage Share	This study analysed variation in the number of tractor use and in cropping

		intensity has positive impact
Kumar and Inderjeet (2010)	Coefficient of Variation & Percentage Share	There is need to formulate policies for the improvement of yield of different crops
Panda (2010	Compound Average Growth Rate and Gini Coefficient	This study suggested there is need for stepping up direct credit to farmers by the institutional agencies.
Asayehengn (2012)	Descriptive Statistics	This paper found the of mean irrigation consumer to non consumer exceed with 37.03 percent.
Maan & Kumar (2012)	Growth Rate and Gini Coefficient	This study found inequality in distribution of loans to distribution of fertilizers had decreased.
Mundal and Dhara (2012)	Composite Development Index	This study suggested that for sustainable development, modern technology of agriculture should have to be adopted.
Maan and Singh (2013)	Percentage Share	The percentage share in agriculture credit increased from 7.3 to 19 percent during 1995 to 2005.
Kumar and Sharma (2013)	Regression Models	This study found food grain crops, non-food grains crops produced per unit of land.
Kumar & Jain (2013)	Compound Annual Growth Rate	This study found inequality in growth of agriculture has increased
Khan et. al. (2013)	Composite index	This study found higher development in upper central part because farmer of this part have better irrigation facilities and high cropping intensity
Mukhopadhgay (2014)	Sigma & Beta Convergence	Food grains production show significant sigma convergence.
Regional Studies		
Narain at. el. (2001)	Composite Index	Found increased 18 percent productivity in rice and 10.5 percent productivity in wheat
Rawal (2004)	Percentage Share	In this study siri households provided as much family labour as possible and mobilized cheap hired labour.
Chaudhary and Madan (2006)	Percentage Share	This study found difference between agriculture and income is varied in difference region

Mohanty (2009)	Composite Index	This study found better situations of the Marathwada area.
Reddy & Sivashankarmma (2010)	Co-efficient of Variation	This study found positive and significant trend in Chittooor district in Andhra Pradesh
Reddy and Reddy (2010)	Simple Average and Percentage Method	This study shows the relationship between total surface sources of irrigation and the canal, tank, other surface sources of irrigation.
Ardeshna and Khunt (2011)	Percentage Method	Plant nutrients are essential not only for increasing production but also for maintaining fertility.
Ajagekar and Masal (2012)	Composite Index	This study analysed regional disparities in the agriculture development
Das and Mili (2012)	Co-efficient of Variation	Agriculture production and modern technologies in agriculture should be increased.
Kumar et.al. (2012)	Composite Development Index	Found two factors green revolution and irrigation facilities are responsible for disparities
Raman and Kumari (2012)	Composite Development Index	Long term policy should be introduced by government.
Pawar and Jadhav (2012	Composite Development Index	Suggested that improved irrigation facilities.

2.3) Research Gap

There are literature related the agricultural growth, like cropping pattern and disparities in agriculture in India. Several studies such as Mehra (1981), Hazell (1982), Rao et al(1988) etc. have pointed out that the new strategy of agricultural production based on HYV seed fertilizer technology has contributed to the growth in production and productivity in India. Bhalla and Singh (2001) showed that a marked acceleration took place in both the output and yield growth rate in Indian agriculture during 1980-83 to 1992-95. Ghosh (2006) analysed the l disparities in agricultural development in India during 1960-61 to 2001-02. Many studies such as those by

Evans and Karras (1996), Sala-i-Martin (1996), and Evans (1997) found beta convergence in per capita log income among the states of the U.S.A. On the other hand, Somasekharan et al. (2011) measured the convergence hypothesis in per capita agricultural output and food grains productivity India. Previous studies were based on global and Indian level studies. This study is based on special Haryana district-wise and zone wise.